

We claim:

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1. An isolated nucleic acid molecule comprising a member of the group consisting of:

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(a) a nucleotide sequence that encodes a polypeptide having the amino acid sequence of FIG. 2;

(b) the complement of the nucleotide sequence of (a);

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(c) a HBMYCNG gene or a complement of a HBMYCNG gene as contained in ATCC Deposit No. _____;

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(d) an isolated nucleic acid molecule comprising nucleotides 23 to 2011 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide of SEQ ID NO:2 minus the start codon;

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(e) an isolated nucleic acid molecule comprising nucleotides 20 to 2011 of SEQ ID NO:1, wherein said nucleotides encode a polypeptide of SEQ ID NO:2 including the start codon;

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(f) An isolated nucleic acid molecule comprising the nucleotide sequence of FIG. 1;

(g) A nucleic acid molecule comprising a nucleotide sequence encoding a deletion mutant of HBMYCNG or the complement of the nucleotide sequence of the deletion mutant of HBMYCNG;

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(h) a nucleic acid molecule capable of hybridizing to and which is at least 95% identical to a nucleic acid molecule of (a), (b), (c), (d), (e), (f), or (g); and

5 (i) An isolated nucleic acid molecule of (h),
further comprising a label.

2. An isolated nucleic acid molecule comprising a
nucleotide sequence that hybridizes to the nucleic acid
of claim 1 and encodes a naturally occurring HBMYCNG
10 polypeptide.

3. An isolated nucleic acid molecule of claim 2
further comprising the nucleotide sequence linked
uninterrupted by stop codons to a nucleotide sequence
15 that encodes a heterologous protein or peptide.

4. A recombinant vector containing the nucleotide
sequence of claim 1.

20 5. A genetically engineered host cell containing
the nucleotide sequence of claim 1.

6. The genetically engineered host cell of claim 5
containing the nucleotide sequence of claim 1 operatively
25 associated with a regulatory nucleotide sequence
containing transcriptional and translational regulatory
information that controls expression of the nucleotide
sequence in a host cell.

30 7. A method of making an HBMYCNG polypeptide
comprising the steps of:

- (a) culturing the cell of claim 6 in an
appropriate culture medium to produce an
HBMYCNG polypeptide; and
- 35 (b) isolating the HBMYCNG polypeptide.

8. The method of claim 7, wherein the HBMYCNG
5 polypeptide is HBMYCNG or a functionally equivalent
derivative thereof.

9. An antibody preparation which is specifically
reactive with an epitope of an HBMYCNG polypeptide.

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10. A transgenic animal comprising the nucleic acid
molecule of claim 1.

11. A substantially pure polypeptide comprising a
15 member of the group selected from:

- (a) A substantially pure polypeptide encoded
by the nucleic acid molecule of claim 1;
- (b) A substantially pure human polypeptide, as
depicted in FIG. 2;
- 20 (c) A substantially pure polypeptide which is
at least 95% identical to the polypeptide
as set forth in FIG. 2;
- (d) A substantially pure polypeptide
comprising amino acids 2 to 664 of SEQ ID
25 NO:2, wherein said amino acids 2 to 664
comprise a polypeptide of SEQ ID NO:2
minus the start methionine; and
- (e) A substantially pure polypeptide
comprising amino acids 1 to 664 of SEQ ID
30 NO:2.

12. A fusion protein comprising a polypeptide of
claim 11 and a second heterologous polypeptide.

35 13. A test kit for detecting and/or quantitating a
wild type or mutant HBMYCNG nucleic acid molecule in a
sample, comprising the steps of contacting the sample

with a nucleic acid molecule of claim 1; and detecting
5 and/or quantitating the label as an indication of the
presence or absence and/or amount of a wild type or
mutant HBMYCNG nucleic acid.

14. A test kit for detecting and/or quantitating a
10 wild type or mutant HBMYCNG polypeptide in a sample,
comprising the steps of contacting the sample with the
antibody of claim 9; and detecting and/or quantitating a
polypeptide-antibody complex as an indication of the
presence or absence and/or amount of a wild type or
15 mutant HBMYCNG nucleic acid.

15. A method for identifying compounds that
modulate HBMYCNG activity comprising:

- 20 (a) contacting a test compound to a cell that
expresses a HBMYCNG gene;
(b) measuring the level of HBMYCNG gene
expression in the cell; and
(c) comparing the level obtained in (b) with
the HBMYCNG gene expression obtained in
25 the absence of the compound;

such that if the level obtained in (b) differs from that
obtained in the absence of the compound, a compound that
modulates HBMYCNG activity is identified.

30 16. A method for identifying compounds that
modulate HBMYCNG activity comprising:

- (a) contacting a test compound to a cell that
contains a HBMYCNG polypeptide;
(b) measuring the level of HBMYCNG polypeptide
35 or activity in the cell; and
(c) comparing the level obtained in (b) with
the level of HBMYCNG polypeptide or

activity obtained in the absence of the
5 compound;
such that if the level obtained in (b) differs from that
obtained in the absence of the compound, a compound that
modulates HBMYCNG activity is identified.

- 10 17. A method for identifying compounds that
regulate ion channel-related disorders, comprising:
- (a) contacting a test compound with a cell
which expresses a nucleic acid of claim 1,
and
 - 15 (b) determining whether the test compound
modulates HBMYCNG activity.

18. A method for the treatment of ion
channel-related disorders, comprising administering an
20 effective amount of a compound that increases expression
of a HBMYCNG gene.

19. A pharmaceutical formulation for the treatment
of ion channel-related disorders, comprising a compound
25 that activates or inhibits HBMYCNG activity, mixed with a
pharmaceutically acceptable carrier.

20. A method for identifying compounds that modulate
the activity of an ion channel comprising:
- 30 (a) contacting a test compound to a cell that
expresses a HBMYCNG gene and the ion
channel, and measuring Ca^{+2} flux into the
cell;
 - (b) contacting a test compound to a cell that
35 expresses a HBMYCNG gene but does not
express the ion channel, and measuring
 Ca^{+2} flux into the cell; and

(c) comparing Ca²⁺ flux obtained in (b) with
 5 the Ca²⁺ flux obtained in (a);
 such that if the level obtained in (b) differs from that
 obtained in (b), a compound that modulates ion channel
 activity is identified.

10 21. An isolated nucleic acid molecule consisting of
 a member of the group consisting of:

- (a) a nucleotide sequence that encodes a
 polypeptide having the amino acid sequence
 of FIG. 2;
- 15 (b) the complement of the nucleotide sequence
 of (a);
- (c) a HBMYCNG gene or a complement of a
 HBMYCNG gene as contained in ATCC Deposit
 No. _____;
- 20 (d) an isolated nucleic acid molecule
 comprising nucleotides 23 to 2011 of SEQ
 ID NO:1, wherein said nucleotides encode a
 polypeptide of SEQ ID NO:2 minus the start
 codon;
- 25 (e) an isolated nucleic acid molecule
 comprising nucleotides 20 to 2011 of SEQ
 ID NO:1, wherein said nucleotides encode a
 polypeptide of SEQ ID NO:2 including the
 start codon;
- 30 (f) An isolated nucleic acid molecule
 comprising the nucleotide sequence of FIG.
 1;
- (g) A nucleic acid molecule comprising a
 nucleotide sequence encoding a deletion
 35 mutant of HBMYCNG or the complement of the
 nucleotide sequence of the deletion mutant
 of HBMYCNG;

- 5 (h) a nucleic acid molecule capable of hybridizing to and which is at least 95% identical to a nucleic acid molecule of (a), (b), (c), (d), (e), (f), or (g); and
- (i) An isolated nucleic acid molecule of (h), further comprising a label.

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22. A substantially pure polypeptide consisting of a member of the group selected from:

- 15 (a) A substantially pure polypeptide encoded by the nucleic acid molecule of claim 1;
- (b) A substantially pure human polypeptide, as depicted in FIG. 2;
- (c) A substantially pure polypeptide which is at least 95% identical to the polypeptide as set forth in FIG. 2;
- 20 (d) A substantially pure polypeptide comprising amino acids 2 to 664 of SEQ ID NO:2, wherein said amino acids 2 to 664 comprise a polypeptide of SEQ ID NO:2 minus the start methionine; and
- 25 (e) A substantially pure polypeptide comprising amino acids 1 to 664 of SEQ ID NO:2.

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